
Remote Sensing Procurement Package

A Management Report For State and Local Governments

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TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	1
REMOTE SENSING PROCUREMENT PROBLEMS	2
THE REMOTE SENSING PROCUREMENT PACKAGE	3
BENEFITS OF THE PACKAGE	4
THE TECHNICAL GUIDE	5
PLANNING A REMOTE SENSING PROCUREMENT PROJECT	7
ORGANIZING AND STAFFING A REMOTE SENSING PROCUREMENT PROJECT	8
IMPLEMENTING A REMOTE SENSING PROCUREMENT	11

MANAGEMENT REPORT

INTRODUCTION

City, county, and state governments engage in a variety of activities that require extensive data. These include land use planning, resource monitoring and control, economic development, and roadway and capital facilities construction. The need for timely reliable data to implement these programs is enormous and data collection is potentially costly. Remote sensing is an established technique for data collection that is widely used by local and state governments and regional agencies. However, the complexity, variety, and rapidly developing nature of remote sensing technology complicates the procurement process for remote sensing products, services and equipment. As a result, state and local government officials are frequently confused about what they need; where they can obtain it; and how to proceed to acquire remote sensing products and services.

A Remote Sensing Procurement Package has been designed to assist local and state governments with their procurement processes. This Management Report will describe the contents of the Package and explain its benefits. Besides containing an overview of the remote sensing procurement process this report will also provide guidelines for planning, organizing, staffing, and implementing the procurement effort. This Management Report is written for chief executives or their assistants, department directors, senior management, procurement officials,

information managers, planning and public works directors, resource managers and other state, regional and local government officials responsible for purchasing remote sensing products, services, or equipment.

REMOTE SENSING PROCUREMENT PROBLEMS

In the broadest sense remote sensing is defined as the imaging or recording of physical phenomena at a distance by detecting the radiant electromagnetic energy which the phenomena either reflect or emit. As such, remote sensing covers a wide range of techniques and approaches ranging from conventional aerial surveys to satellite data collection in both image and digital formats.

Aerial photography is the oldest and most commonly used remote sensing technique used by local and state governments. However, the field has expanded rapidly with the introduction of multispectral sensors capable of obtaining data simultaneously from several bands of the electromagnetic spectrum; satellites such as Landsat that are solely devoted to the collection of earth resources data; and computer hardware and software designed to process, analyze and display an incredible volume of remote sensor data both efficiently and rapidly.

These new developments in the technology offer exciting opportunities to increase the efficiency and effectiveness of remote sensing data collection. Unfortunately local and state officials may not have the experience, training or knowledge about newer remote sensing techniques to determine their feasibility for local and state government applications. Other factors which may also make it difficult to purchase both conventional and innovative remote sensing products, services, and equipment include the following:

- o Management may not have a method for recognizing and assessing the appropriate role of remotely sensed data in meeting a variety of information needs;
- o Management may have difficulty assessing the value of remotely sensed data to operations and decision making;
- o Procurement personnel may be unsure how to develop specifications for remote sensing procurements because each jurisdiction's requirements are often unique or unusual.
- o It may be difficult to evaluate the trade offs between cost and technical considerations especially with the more complex or innovative remote sensing systems;
- o The jurisdiction may be forced to solicit responses from firms located outside its geographic area in order to obtain a sufficient number of bids or proposals;
- o Complex or costly procurements may require the use of negotiations or other procurement strategies not commonly used;
- o Careful contract administration may be required to avoid cost overruns and delays;
- o A post-procurement evaluation may be needed to determine the actual effect and success of the procurement.

THE REMOTE SENSING PROCUREMENT PACKAGE

The National Aeronautics and Space Administration's (NASA) Regional Remote Sensing Applications Program has provided financial support to Public Technology, Inc. (PTI) to document a remote sensing procurement methodology which addresses these problems. This Management Report is part of a package of tools designed to assist state and local governments. The complete Remote Sensing Procurement Package consists of four documents:

- o Remote Sensing Procurement: An Executive Summary -- A short brochure, written for elected officials and chief executives, that discusses the benefits of a structured remote sensing procurement process and describes the package organization, content, and scope.

- o Remote Sensing Procurement: A Management Report for State and Local Governments -- A short document written for chief executives, senior administrators, information managers, planning and public works directors, and other city, county, and state government officials responsible for purchasing remote sensing products, services, or equipment. The Management Report describes the contents of the package and explains its benefits. Besides containing an overview of the remote sensing procurement process, the Management Report also provides guidelines for planning, organizing, staffing and implementing a remote sensing procurement project.
- o Remote Sensing Procurement: A Technical Guide for State and Local Governments -- A step-by-step procedural guide to the tools and techniques of remote sensing procurement written for information managers, planners, public works officials, resource managers, and procurement specialists who will be directly involved in all aspects of a remote sensing procurement process. The Guide is divided into six sections that cover the major components of Remote Sensing Procurement. These include: Need Identification, Preparing Specifications and Evaluation Criteria, Bid or Proposal Solicitation, Bid or Proposal Evaluation, Contract Negotiation and Award and Contract Administration.
- o Remote Sensing Procurement: The Remote Sensing Industry Directory A directory of over 140 firms and organizations that contains detailed information on the types of products, services, and equipment they offer. Also included for each firm or organization are addresses, phone numbers, contact person, and experience in the remote sensing field.

BENEFITS OF THE PACKAGE

The remote sensing procurement process outlined in these documents offers several potential benefits to state and local governments:

- o A more thorough investigation of the problem and alternative solutions enables elected officials, chief executives, and senior administrators to better assess staff recommendations;
- o Greater opportunities for interaction between the chief executive's office, user, procurement agency, and other affected agencies enable analysts, technical experts, and other staff or line personnel to shape requirements and evaluation criteria so that the resulting remote sensing product or service more closely conforms to their needs and constraints;
- o Improved requirements and evaluation criteria simplify the selection of a contractor and administration of the contract;

- o Greater understanding of the need, requirements, and capabilities of various firms, coupled with the increased contract administration efforts, result in the timely acquisition of more effective and efficient remote sensing products and services for the public's tax dollar; and
- o Increased structure in the procurement process enables top management to better judge staff performance.

THE TECHNICAL GUIDE

The Technical Guide, the most detailed document in the Package, provides potential remote sensing users having little or no remote sensing training or experience with a step-by-step process for dealing with the special or unique concerns of remote sensing procurements. In addition, remote sensing coordinators and organizations with previous ongoing experience using or procuring remote sensing products and services can use the Guide to make their procurement practices more effective. Finally, purchasing agents and budget officers with extensive training or experience in procurement practice will find the Guide useful to understand the special requirements of remote sensing procurements.

The Technical Guide is organized into seven sections. Section I, Need Identification, discusses how to prepare a Need Statement, how to form a procurement team, and how to conduct a feasibility study. Section II, Preparing Specifications and Evaluation Criteria, discusses how to develop technical specification, how to develop contractual specifications, and how to establish evaluation criteria. Section III, Bid or Proposal Solicitation, discusses how to prepare requests for bids or proposals, and how to solicit them. Section IV, Bid or Proposal Evaluation, discusses how to develop a detailed evaluation plan, how to screen the bids or proposals and how to evaluate the bids or proposals.

Section V, Contract Negotiation and Award, discusses how to prepare for negotiations, how to negotiate an agreement, and how to award the contract. Section VI, Contract Administration, discusses how to monitor contract performance, how to amend the contract, and how to close-out or terminate the contract. Section VII, Evaluating the Procurement, concludes the Technical Guide by discussing how to evaluate the remote sensing product or service, the requirements, and contractual compliance.

The Remote Sensing Industry Directory is the second major document in the Package. The information contained in the Directory was obtained from a mail survey of remote sensing firms and organizations. The 143 firms and organizations included in the Directory are listed in alphabetical order. Information on each of these firms is contained in four separate pages. Each page covers a separate category of information. They are as follows:

1. Summary Information -- This page contains the company name, address, experience in the field, type of remote sensing typically utilized and a brief statement of capabilities.
2. Facilities and Special Equipment -- The second page contains detailed information on the types of aircraft, cameras, scanners, field survey equipment, photographic and photogrammetric processing equipment, etc., owned by the organization.
3. Products and Services Provided -- Specific types of image, photogrammetric, thematic, and interpreted products, and processing, interpretation and analysis services, etc., are listed on the third page.
4. Remote Sensing Equipment/Systems Provided -- A final page is included which contains a detailed listing of the types of hardware, software, and integrated systems which are sold or leased to clients. If the firm or organization does not provide equipment or systems this page is omitted.

The following sections of this Management Report deal with planning, organizing, staffing and implementing a remote sensing procurement project.

PLANNING A REMOTE SENSING PROCUREMENT PROJECT

Because remote sensing procurements may be infrequent and complex, it is likely that no one individual may have the requisite experience or training to handle the procurement alone. In addition, the data collected with remote sensors are often used by a variety of agencies or departments; thus remote sensing expenses may be spread among many individuals in numerous staff and line agencies. A successful procurement process consequently requires a strong commitment from management to pull the necessary resources together.

In addition, the perception that remote sensing is the desired solution to an information problem is often vague and imprecise. It is important that top management determine that the "want" is truly needed before approving a procurement. Top management will also want to insure that the most efficient and effective remote sensing solution is actually procured. Consequently, management's responsibility is to see that user agencies and procurement staff follow a systematic procurement process which involves a clear definition of needs, a careful evaluation of feasible solution alternatives, and the development of specific technical requirements.

Finally, a successful remote sensing procurement also depends in part upon establishing clear lines of responsibility. Thus a decision should be made with respect to:

- o Who should be responsible for managing the procurement effort -- a user, a purchasing professional, or someone from the chief executive's office?
- o Who will be responsible for making critical decisions such as proceeding with the feasibility study, approving a purchase requisition, authorizing the solicitation of bids or proposals or

executing the final contract document -- the procurement manager, a department head, the chief executive or his assistant, elected officials or some combination of these individuals?

ORGANIZING AND STAFFING A REMOTE SENSING PROCUREMENT PROJECT

The project team is recommended as the basic organizational framework for a remote sensing procurement project. This team, called a procurement team, should consist of a procurement manager, a requirements specialist, a procurement specialist, and technical support specialists; this should include representatives from the chief executive's office, the user or requesting agency, the purchasing agency, and other agencies with similar information needs.

The procurement manager is probably the most important person on the procurement team. He or she is responsible for directing the work of other team members and for fashioning a consensus of opinion around recommendations to top management. The procurement manager can be anyone with a good record for getting things done who possesses the following qualifications:

- o A good, general understanding of government operations;
- o Good communication skills;
- o Project management experience;
- o An understanding of the underlying problem and any financial or organizational constraints; and
- o An objective, analytical mind capable of understanding the major technical aspects of the remote sensing procurement.

Assistant city managers, mayoral assistants, technology agents, and science advisors make excellent choices for procurement manager because they represent top management and their authority extends across department lines; however, there are disadvantages to selecting one of these people. The disadvantage in selecting an assistant city manager or mayoral

assistant as the procurement manager is that he or she may be unable to adequately understand the major technical aspects of extremely complex products or services. The disadvantage in selecting a technology agent or science advisor as the procurement manager is that he or she may lack appropriate managerial experience.

The requirements specialist is the user or requesting agency's representative on the procurement team. He or she may be a planner, information manager, public works officer, engineer or any other individual with a thorough understanding of the problem and its solution requirements.

The procurement specialist is the purchasing agency's representative on the procurement team. This individual must bring a sound knowledge of the jurisdiction's procurement codes and accepted procurement practices to the procurement team. The technical support specialist represents other agencies affected by the procurement or specific skills needed by the procurement team. Photo interpreters, draftsmen, negotiators, lawyers and data processing specialists are among those who may be needed as technical support specialists.

It is best to use existing government personnel in staffing the procurement team. The advantages of this approach are: (1) an attitude of cooperation is fostered by the interdepartmental nature of the team; (2) top management sponsorship of the team assures that the project will be responsive to management needs; and (3) an increasing number of personnel are trained in remote sensing procurement techniques as each new project is completed. The major disadvantages of this approach are: (1) the normal duties of the team members will probably slip while the project is in progress; (2) the interdepartmental nature of the team

may create ambiguous lines of authority; and (3) it is sometimes difficult to get firm time commitments from all team members.

There are times, however, when existing staff are unavailable or lack the appropriate skills. In these instances, outside consultants may be used to supplement government personnel. The major advantages of this approach are: (1) less time will be required on the part of government personnel; (2) consultants can be hired who have previous training and experience in using and purchasing remote sensing products or services, and (3) outside personnel may be more objective. The major disadvantages of this approach are: (1) in-house capabilities do not increase, unless training is an explicit part of the contract; (2) outside personnel may not understand the jurisdiction's needs and requirements as well as government personnel; and (3) existing personnel must still do the grant work and orient the consultants.

Another alternative is to supplement a core of government personnel with people from the community. The major advantages of this approach are: (1) less time will be required on the part of government personnel; (2) it may be possible to solicit expertise not possessed by government personnel; and (3) the approach provides a mechanism for increased community involvement with government. The major disadvantages of this approach are: (1) it may be difficult to schedule volunteer efforts within a reasonable time frame since most volunteers already have full-time jobs; (2) community members may not understand the jurisdiction's needs and requirements as well as government personnel; and (3) government employees must still do the grant work and orient the volunteers.

IMPLEMENTING A REMOTE SENSING PROCUREMENT

The major tasks and management approval points involved in implementing a nonstandard procurement project are discussed below and illustrated in Figure 1. For simplicity and clarity, Figure 1 does not show any feedback loops in the process.

Task #1: Develop a Need Statement

The purpose of this task is to determine if the "want" is really needed. Therefore, top management should require the preparation of a Need Statement before considering the purchase of a nonstandard product or service. This Need Statement should describe the information problem, identify what other jurisdictions have done under similar circumstances, propose a remote sensing approach or combination of approaches as a solution to the problem, describe the costs and benefits associated with the solution, and estimate the time and resources required to complete the procurement.

MANAGEMENT APPROVAL POINT #1: Assign Management Responsibility

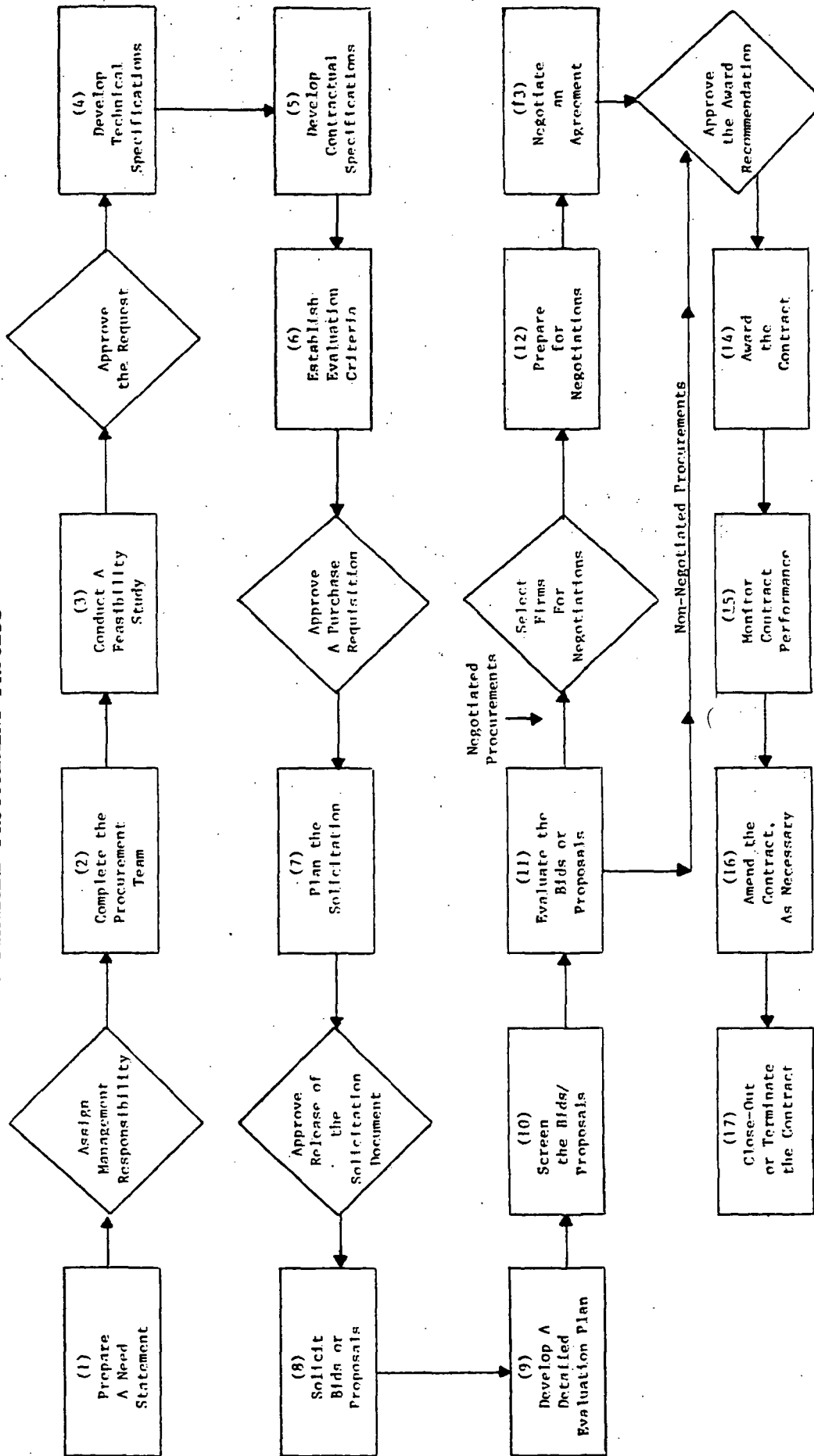
Top management should review the Need Statement and, if the information need clearly exists, select a procurement manager. Top management must then clearly establish the responsibilities and authority of the procurement manager. Guidance on selecting a person for this position is presented earlier in this Management Report.

Task #2: Organize a Procurement Team

Remote sensing products and services are often too important or complex to be studied and purchased by one individual. Therefore, top management should authorize the procurement manager to recruit a requirements specialist, a procurement specialist, and various technical

Figure 1

THE NONSTANDARD PROCUREMENT PROCESS



This diagram summarizes the 17 major tasks and six management approval points in the Remote Sensing Procurement Process. Management can abort the procurement at any of the six decision points. The diagram does not attempt to show any feedback loops in this process.

support specialists from appropriate government agencies to assist with the procurement. (Depending upon the size and capabilities of the staff, the procurement manager may also serve in one or more of these capacities.) The Technical Guide describes the skills and roles of these team members, and outlines how the procurement manager might obtain the appropriate personnel and brief the procurement team.

Task #3: Conduct a Feasibility Study

Next, the procurement team should formulate and examine alternative remote sensing data collection methods for their technical, practical, and economic feasibility. Alternative products or services should also be generated and analyzed to see if they can be implemented from existing resources without purchasing a remote sensing product or service from a private contractor.

MANAGEMENT APPROVAL POINT #2: Approve the Request

The recommendations resulting from the feasibility study should be reported to top management before work begins on the actual procurement. After reviewing the recommendations and ensuring that political, managerial, and other concerns were properly considered, top management must commit the resources needed to purchase or produce the required product or service. Top management should also confirm the authority of the procurement manager to conduct the procurement.

Task #4: Develop Technical Requirements

Technical specifications are essential to a successful remote sensing procurement. The procurement team should assemble specifications used by other governmental and nongovernmental organizations to purchase similar items, and the team may also wish to consult the technical representatives

of potential contractors before selecting relevant requirements. The Remote Sensing Industry Directory should be consulted to locate potential contractors. The team should then draft the specifications, requirement-by-requirement, and establish test or inspection procedures for each. Finally, the team should carefully analyze the effect of each specification and refine those that are restrictive, ambiguous, or otherwise flawed.

Task #5: Develop Contractual Requirements

The procurement team should select a contract type from among several variations of fixed-price and cost-reimbursable contracts. Then, after reviewing various checklists of contractual terms and conditions, the team should select those that are essential for the current procurement. The actual contractual language is drafted next (or the purpose of each provision is stated) followed by the analysis and refinement of each specification.

Task #6: Establish Evaluation Criteria

Discriminating evaluation criteria are also essential to a successful remote sensing procurement. Evaluation criteria define the minimum qualifications of acceptable contractors and measure their capability, and the capability of their bids or proposals, to satisfy the technical and contractual specifications. The procurement team should define screening criteria for eliminating unacceptable bids or proposals from detailed consideration, and technical, managerial, business, and cost criteria for determining the relative merits of acceptable bids or proposals. The procurement team should then establish priorities among these evaluation criteria.

MANAGERIAL APPROVAL POINT #3: Approve a Purchase Requisition

The purchase requisition provides top management with the opportunity to review the specifications and evaluation criteria before bids or proposals are solicited from potential contractors. Top management should focus its attention on the adequacy of the evaluation criteria and then, if funding is available, approve the purchase requisition.

Task #7: Develop the Solicitation Document

There are three basic strategies that may be used in nonstandard procurements -- Sealed Competitive Bidding, Design Competition, and Negotiation -- and several variations on these strategies. The procurement team must select one strategy, develop procedures for handling inquiries and amending the solicitation, and prepare a bid or proposal solicitation document (e.g., an Invitation for Bids or Request for Proposals).

MANAGEMENT APPROVAL POINT #4: Approve the Release of the Solicitation

Top management should be given the opportunity to cancel the solicitation at this point. They should question whether the remote sensing product or service is still needed, and then act accordingly.

Task #8: Solicit Bids or Proposals

The procurement team should advertise the procurement, solicit bids or proposals directly from known qualified firms and, if conditions warrant it, conduct a pre-bid conference. The procurement team should also refer to The Remote Sensing Industry Directory which is part of this Procurement Package to locate suppliers of remote sensing products and services for direct soliciting. Consideration should also be given to placing advertisements in regional, statewide, and national publications, as well as

in local newspapers, to attract interest in the procurement from a larger number of qualified firms.

Task #9: Develop a Detailed Evaluation Plan

A detailed evaluation plan should be developed any time after the evaluation criteria are established (Step #6) and before the bids or proposals are screened (Step #10). The procurement team first must formulate an evaluation strategy combining various evaluation and weighting techniques, then appropriate forms and instructions must be prepared. Finally, the evaluators should be selected and briefed on evaluation procedures.

Task #10: Screen the Bids or Proposals

This task is essentially a preliminary evaluation designed to eliminate clearly unacceptable bids or proposals from detailed consideration. The procurement team should open the bids or proposals, eliminate the unacceptable ones, and then solicit additional information required by the procurement strategy.

Task #11: Evaluate the Bids or Proposals

At this point, the procurement team is ready to evaluate the remaining bids or proposals. The previously established evaluation criteria are used to evaluate technical, managerial, and business factors. Price and cost analysis techniques are then used to evaluate costs, and an overall ranking is prepared. Finally, the evaluators' recommendations are compiled in an Evaluation Report.

MANAGEMENT APPROVAL POINT #5: Select Firms for Negotiations (Optional)

Top management should review the Evaluation Report and approve its recommendations before negotiations are initiated. Recommendations on which firms to negotiate with should be accepted unless: (1) any

irregularities in the evaluation process are uncovered that might affect the recommendations, or (2) significant political or other considerations were not accounted for in the evaluation. If top management disagrees with the procurement team's recommendations, they should document the rationale for their decisions.

Task #12: Prepare for Negotiations (Optional)

Successful negotiations require careful preparation. The procurement team should begin by formulating negotiating objectives based on the shortcomings of each proposal. An experienced negotiator and other members of a negotiating team should then be selected. The negotiating team should review the procurement, be briefed on the roles and responsibilities of individual team members, determine the relative bargaining positions of the jurisdiction and each prospective contractor, select a time and place for negotiations, and prepare a meeting agenda.

Task #13: Negotiate an Agreement (Optional)

The actual negotiations involve three stages: (1) discussions are initiated; (2) the negotiating team endeavors to sell the jurisdiction's position on each issue to the contractor; and (3) the negotiations are concluded. In initiating discussions, the negotiating team should try to elicit as much information as possible from the contractor. Various negotiating tactics come into play during the second stage and, once an agreement is reached, a memorandum of understanding should be signed by both parties. An Award Recommendation should then be prepared and forwarded to top management.

MANAGEMENT APPROVAL POINT #6: Approve the Award Recommendations

Top management must make the final contract award decision based upon

the Evaluation Report and, if negotiations were conducted, upon the Award Recommendation. This decision should be based upon whether:

(1) the product or service is still needed; (2) the requirements have changed; (3) irregularities were found in the procurement process that could have affected the award recommendation; and (4) government has the requisite authority and financial resources to sign a contract. Top management should rely heavily on the procurement team's recommendations on which offer is best for the jurisdiction, and document the rationale for selecting a different offer.

Task #14: Award the Contract

The contractual documents should now be drafted and reviewed by both legal and technical personnel. The contract should then be executed, with the selected contractor signing first and the appropriate government official second. Last, unsuccessful offerers should be notified.

Task #15: Monitor Contract Performance

The contractor's performance on the contract should be closely monitored. A Contract Administrator should be designated, and he or she should implement the appropriate schedule, cost, and quality controls. The Contract Administrator should then use the resulting reports to regularly monitor progress and correct any problems that occur.

Task #16: Amend the Contract, As Necessary

While contract amendments should be held to a minimum, circumstances do change and contract amendments are sometimes unavoidable. In these instances, the contract amendment should be drafted; its impact assessed; its cost estimated; and an acceptable agreement negotiated.

Task #17: Close-Out or Terminate the Contract

The contract is closedout after all products or services are delivered in acceptable condition; the contractor's final invoice is then paid. However, the contract may be terminated for cause (i.e., default) prior to its completion if the contractor fails to meet the terms of the contract. The contract also may be terminated for any other reason if it includes a termination for convenience clause.

FURTHER INFORMATION

The Nonstandard Procurement Package was prepared by Public Technology, Inc. with financial assistance from the National Aeronautics and Space Administration's (NASA) Regional Remote Sensing Applications Program. This Program is located within the Office of Space and Terrestrial Applications. The Package makes use of a non-standard procurement process originally developed with assistance from the Division of Intergovernmental Science and Public Technology of the National Science Foundation.

Public Technology, Inc. is a nonprofit, public service organization that works to define state and local government problems, locate promising technologies, and provide assistance in implementation at the operational level. PTI was originally organized by the six national public interest groups representing state and local governments: the Council of State Governments, International City Management Association, National Association of Counties, National Governors' Conference, National League of Cities, and U.S. Conference of Mayors.

State or local government officials requiring additional information on remote sensing procurement may contact:

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